



Weatherford

MICRORESISTIVITY LOG

COMPANY

O'BRIEN RESOURCES, LLC.

WELL

JECCHA 4 #2

FIELD

WILDCAT

PROVINCE/COUNTY

RUSH

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1302' FNL & 2137' FWL

SEC 4

TWP 19S RGE 17W

Other Services

Latitude

MDN/MPD

MSS

Longitude

MSS

API Number

15-165-22137

Permanent Datum GL, Elevation 2070 feet

Log Measured From KB

Drilling Measured From KB @ 13 FEET

Date

04-OCT-2016

Run Number

ONE

Service Order

4558-162772378

Depth Driller

3907.00 feet

Depth Logger

3908.00 feet

First Reading

3862.00 feet

Last Reading

2300.00 feet

Casing Driller

265.00 feet

Casing Logger

267.00 feet

Bit Size

7.875 inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.35 lb/USg 53.00 CP

PH / Fluid Loss

9.50 13.60 ml/30Min

Sample Source

FLOWLINE

Rm @ Measured Temp

0.46 @ 75.0 ohm-m

Rmf @ Measured Temp

0.37 @ 75.0 ohm-m

Rmc @ Measured Temp

0.55 @ 75.0 ohm-m

Source Rmf / Rmc

CALC CALC

Rm @ BHT

0.33 @103.0 ohm-m

Time Since Circulation

4 HOURS

Max Recorded Temp

103.00 deg F

Equipment / Base

13096 OKC

Recorded By

ADAM SILL

Witnessed By

JIM MUSGROVE

Elevations:
KB 2083.00
DF 2081.00
GL 2070.00

BOREHOLE RECORD

Last Edited: 04-OCT-2016 13:29

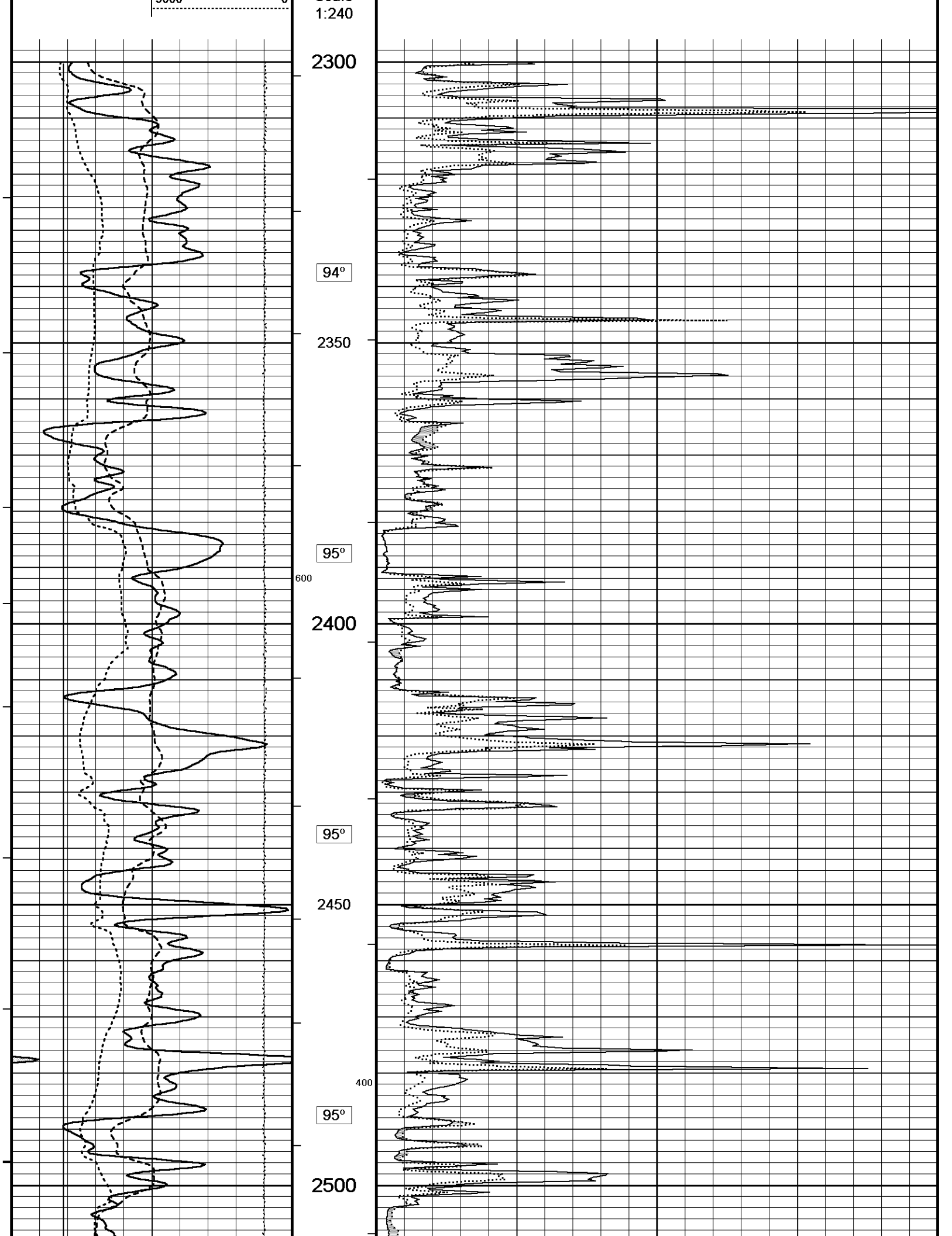
Bit Size inches	Depth From feet	Depth To feet
7.875	265.00	3907.00

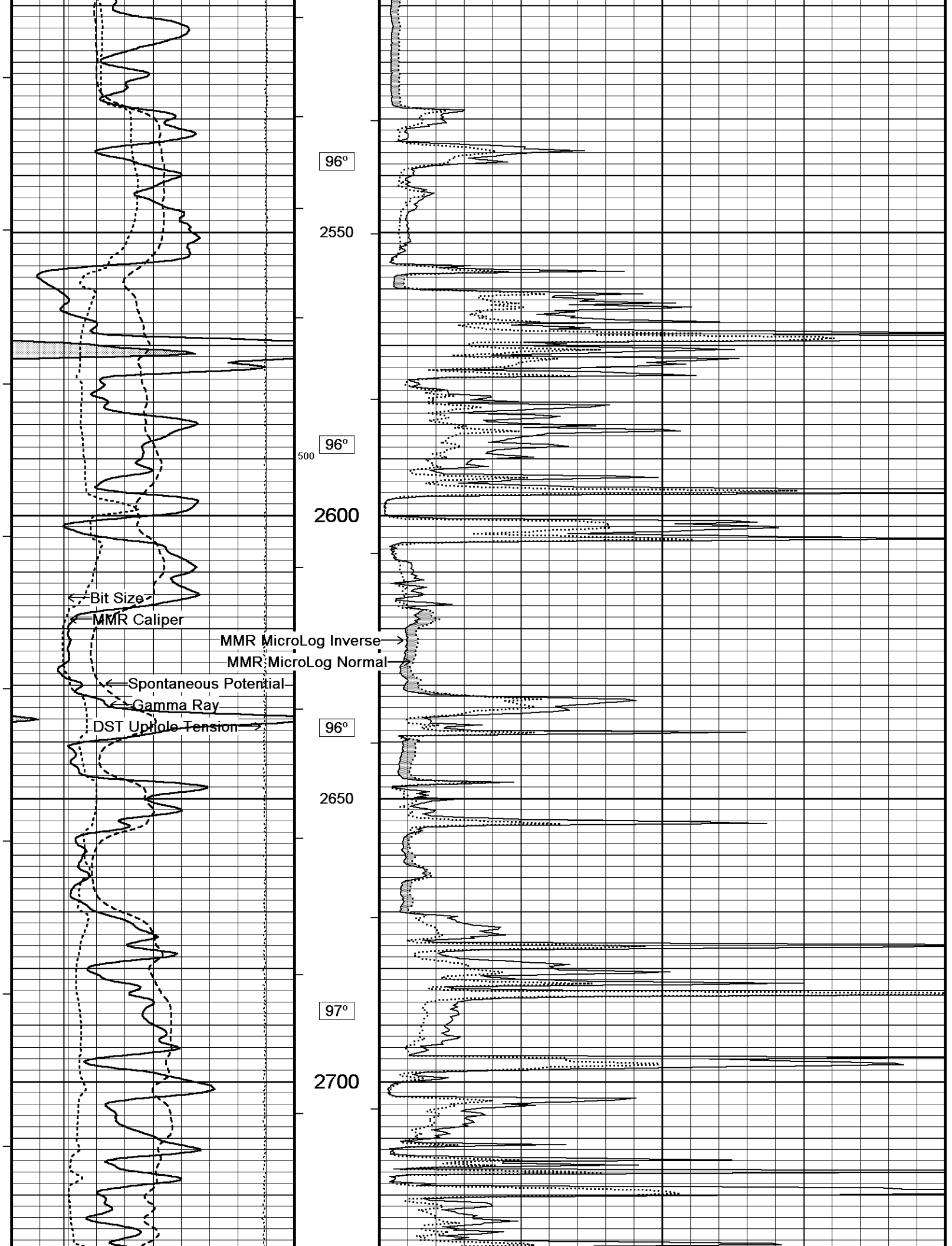
CASING RECORD

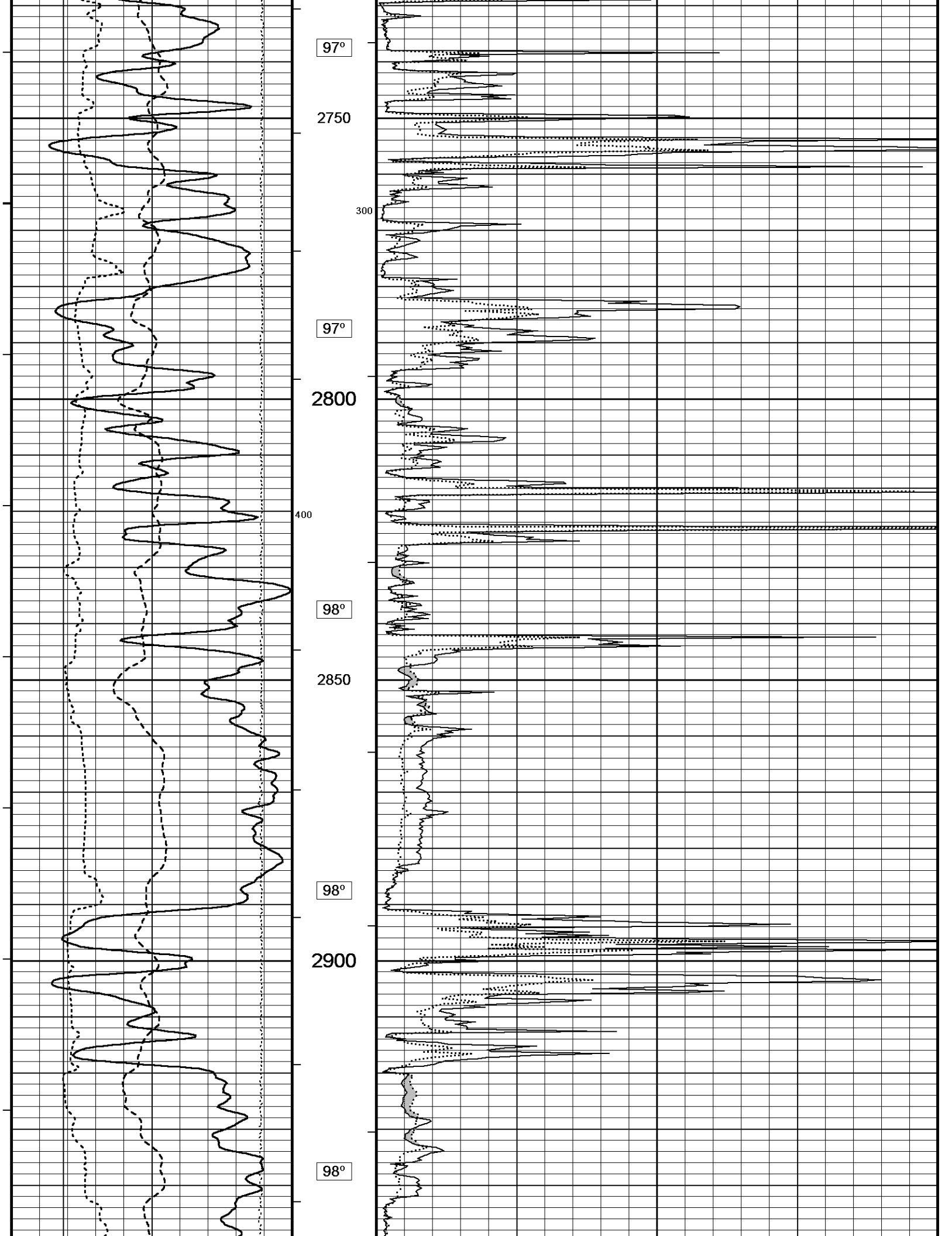
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	265.00	24.00

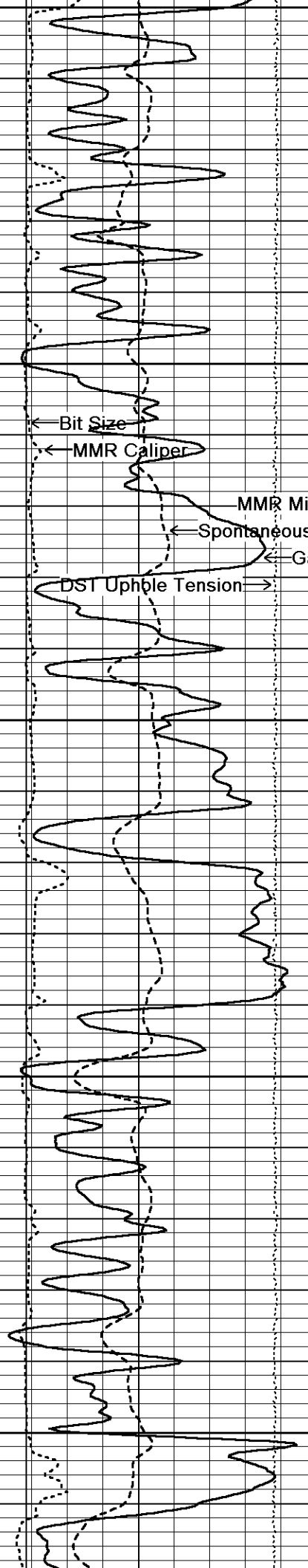
REMARKS

- SOFTWARE ISSUE: WLS 15.03.5939.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING USED ON MDN.
 - 0.5 INCH STANDOFF USED ON MFE.
 - TWO 0.5 INCH STANDOFFS USED ON MSS.
 - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1742 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 2300: 466 CU.FT.

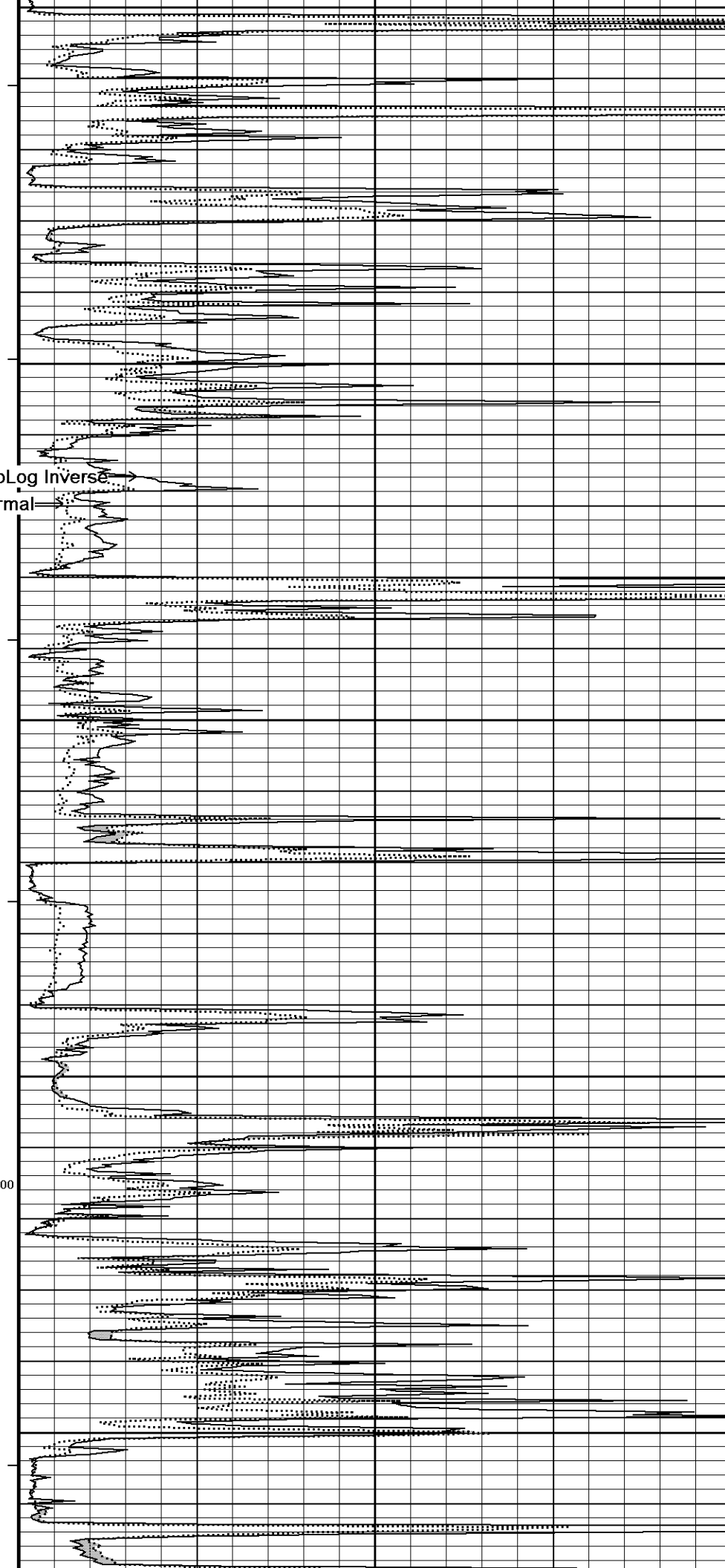


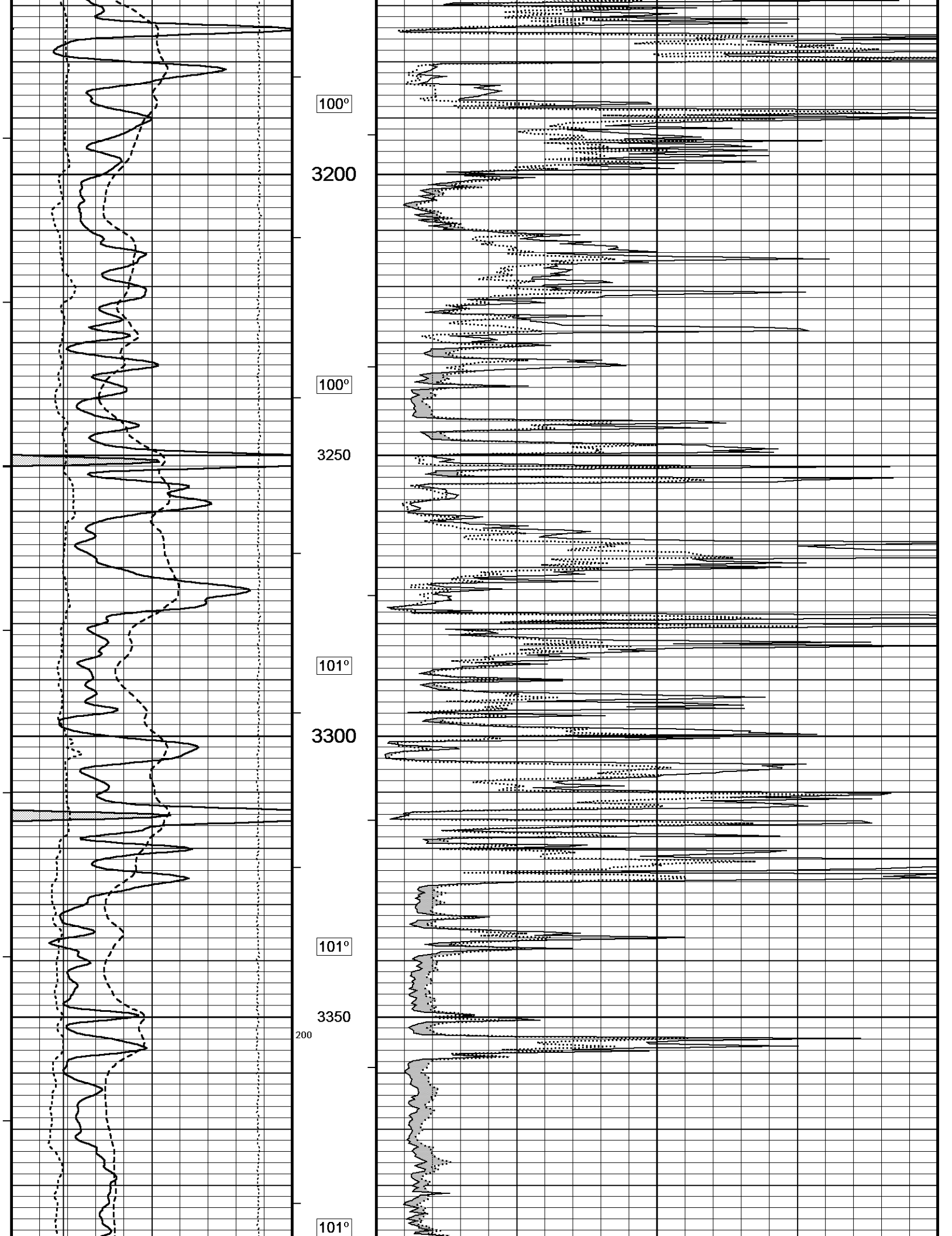


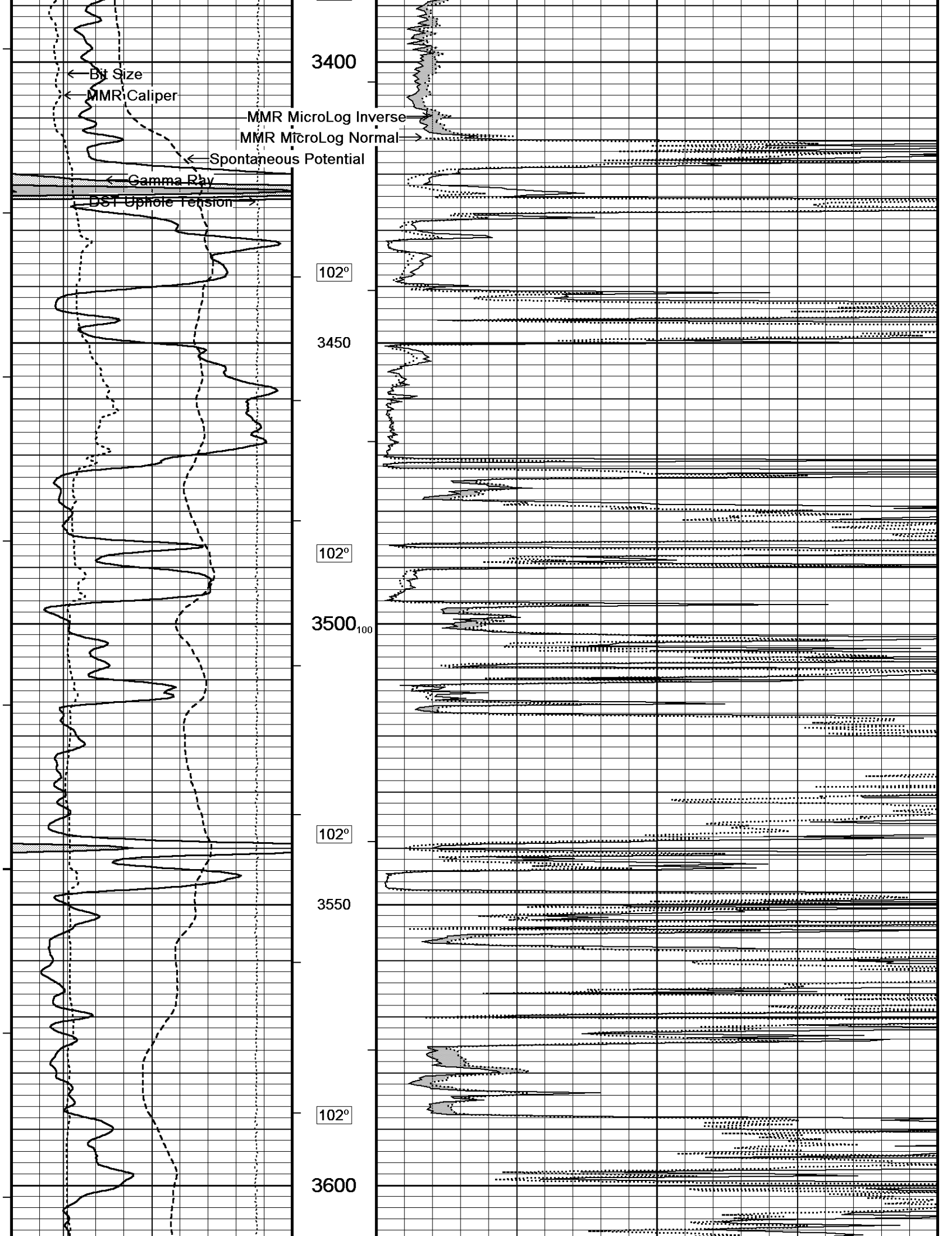


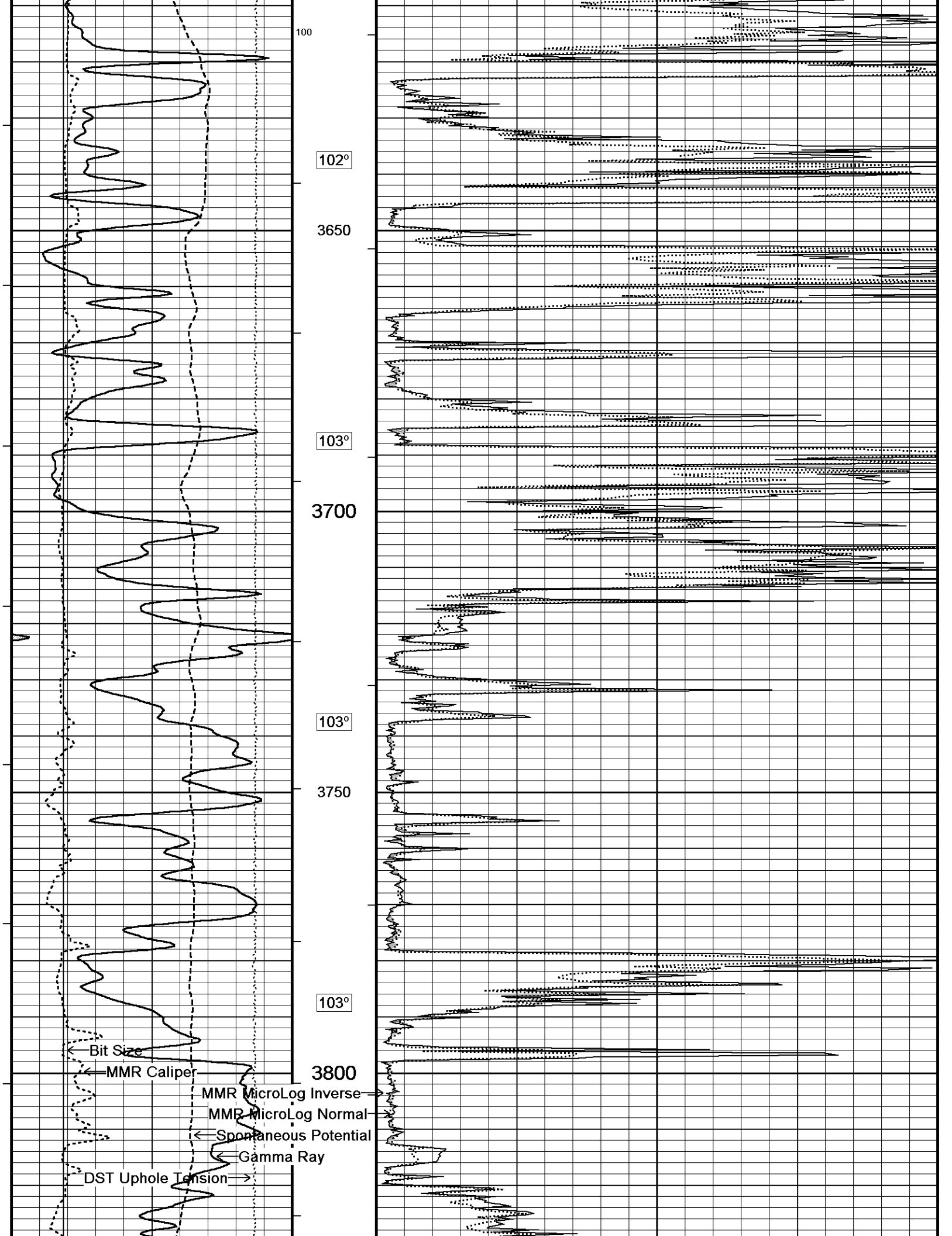


2950
99°
3000
99°
3050
300
100°
3100
200
100°
3150









103°

3850

3900

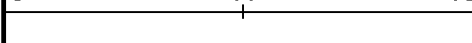
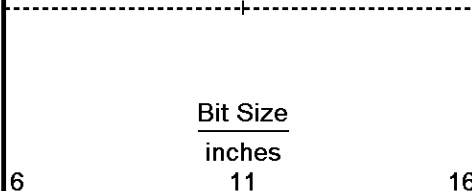
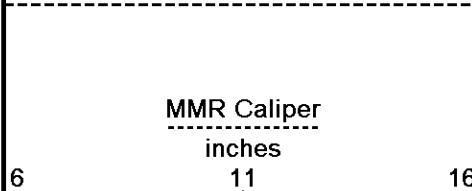
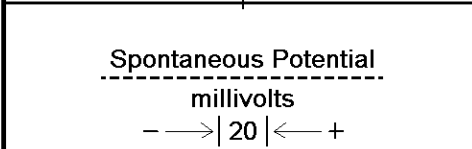
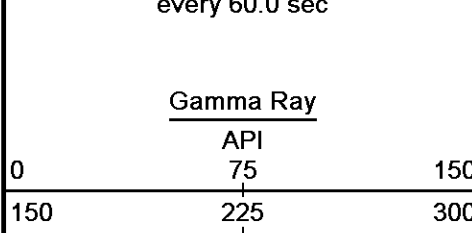
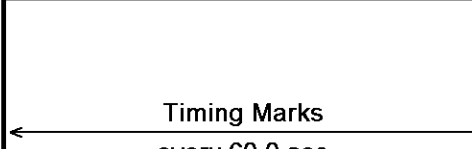
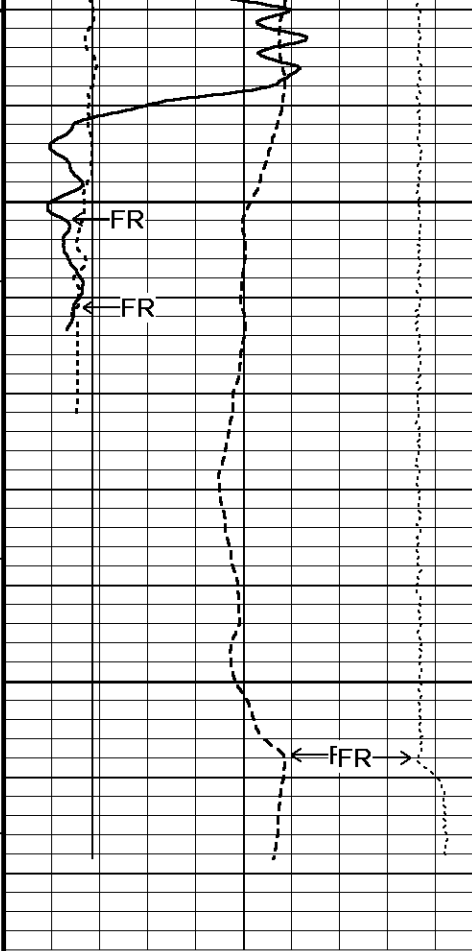
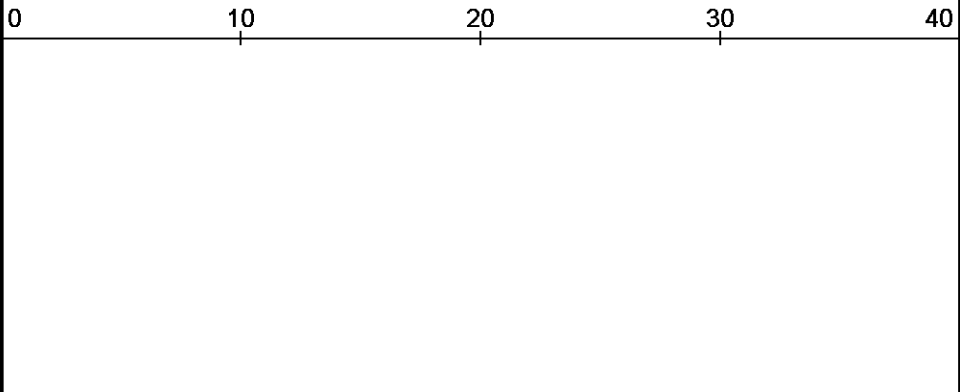
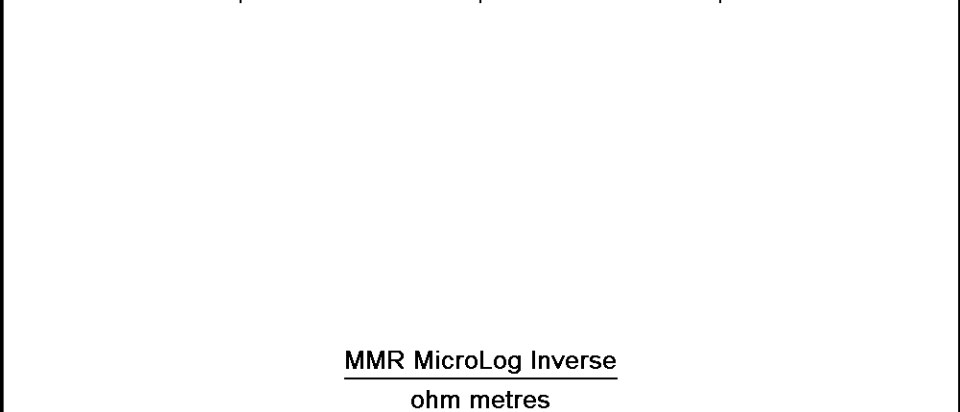
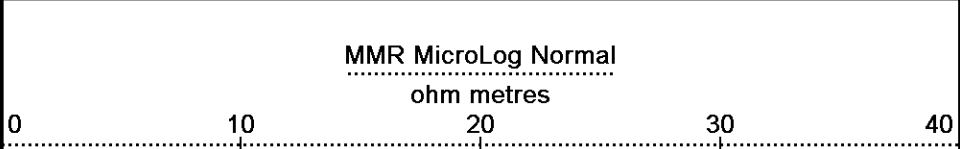
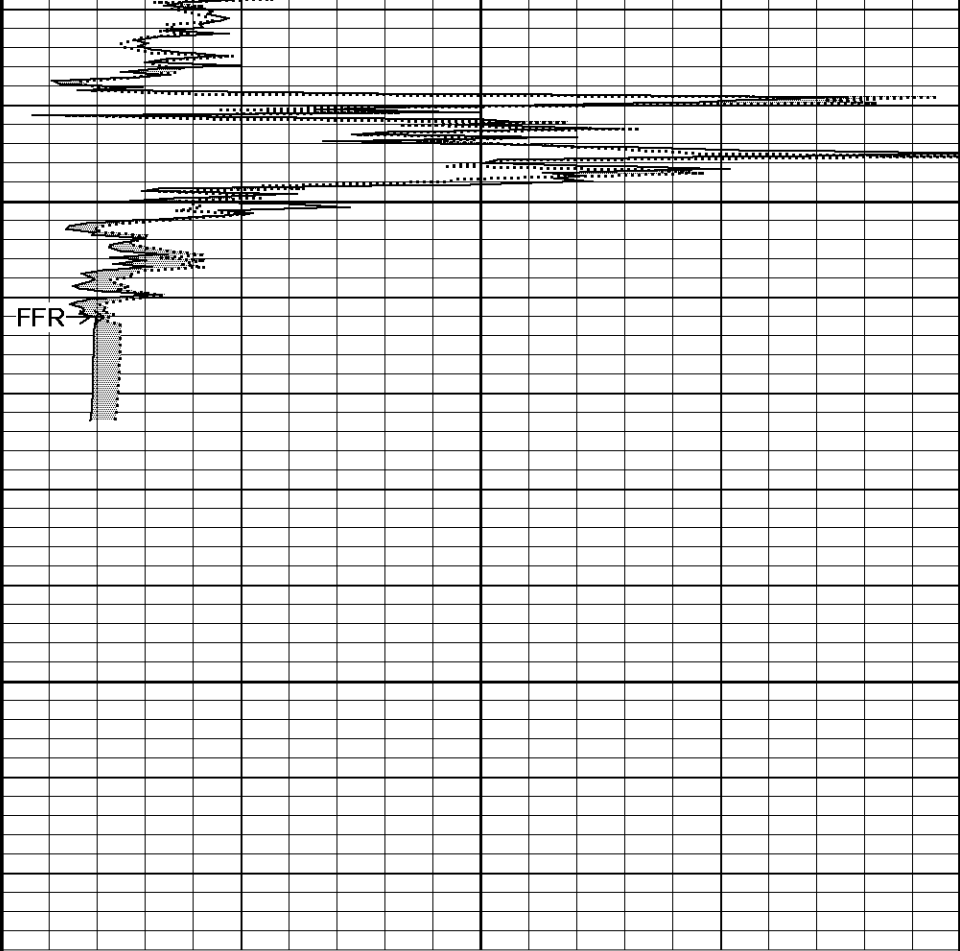
TD

Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft



DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 04-OCT-2016 18:59

Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_002.dta

Recorded on 04-OCT-2016 16:29

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939



5 INCH MAIN



REPEAT SECTION



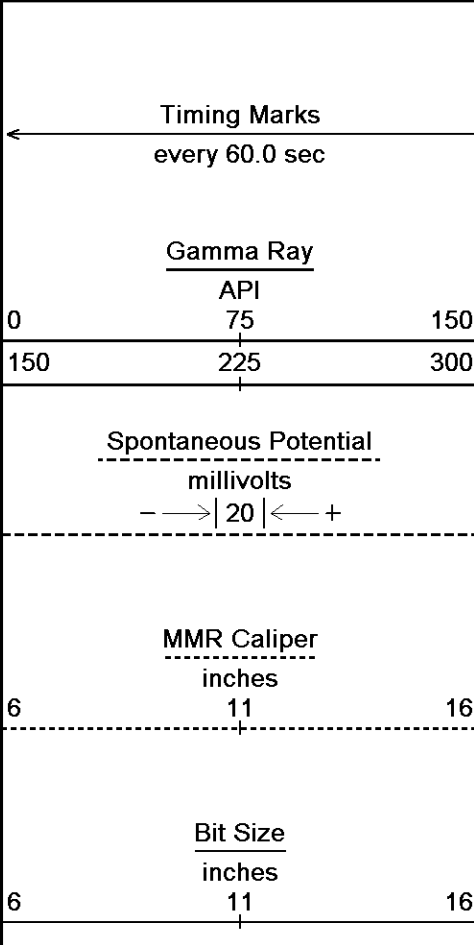
Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 04-OCT-2016 18:59

Filename: C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_001.dta

Recorded on 04-OCT-2016 16:05

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

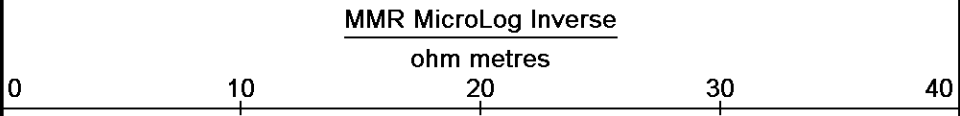
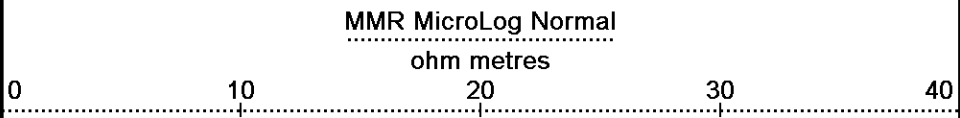


Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

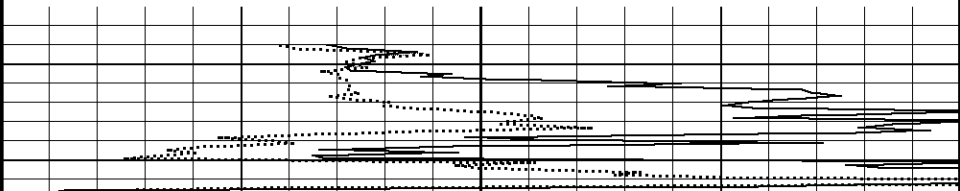


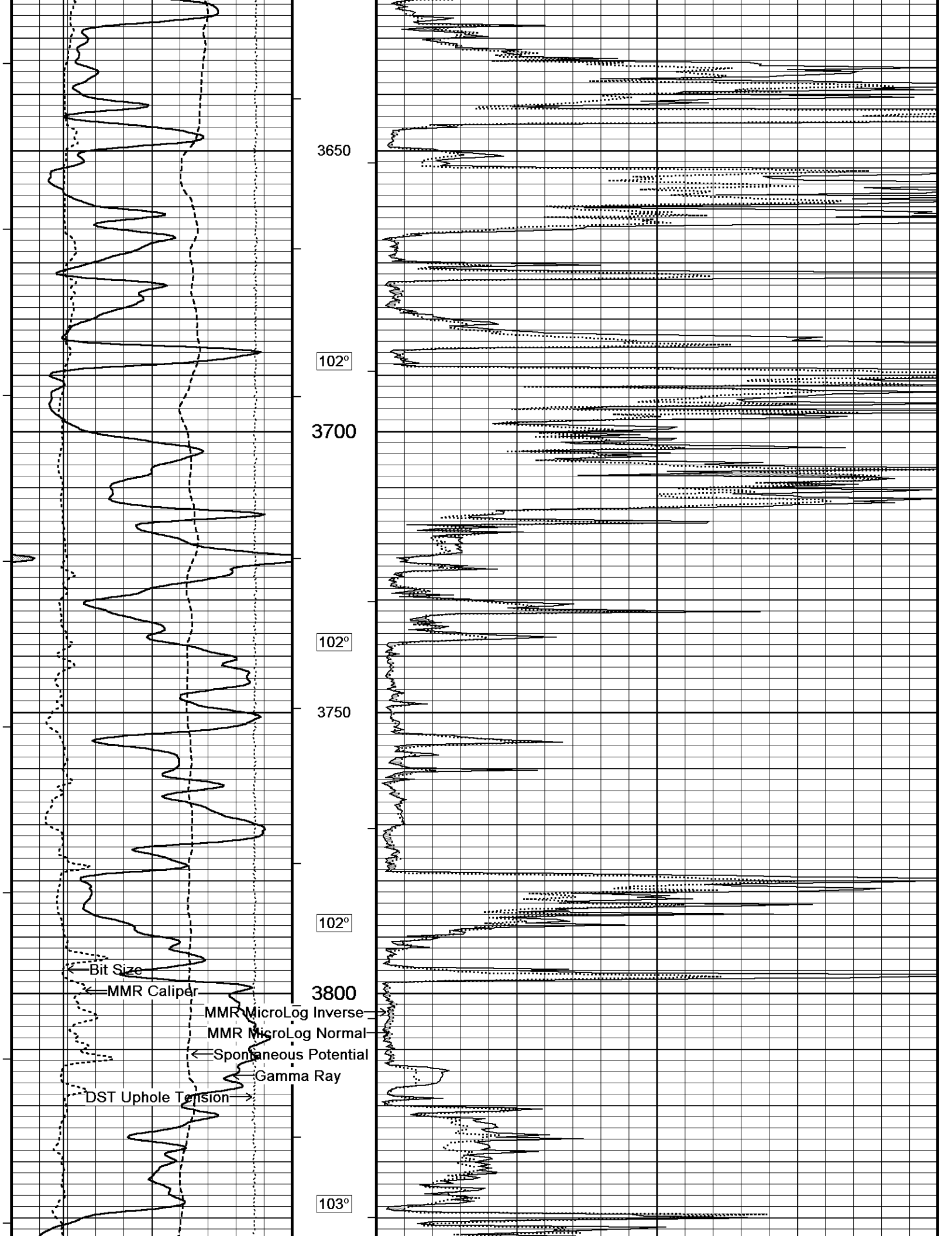
DST Uphole Tension
pounds
5000 0

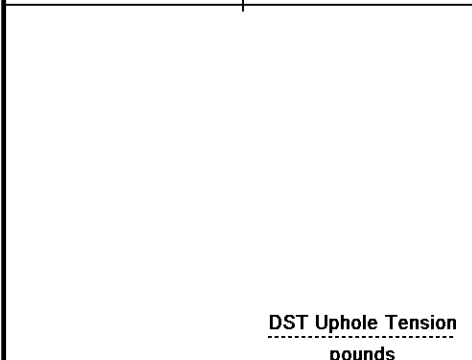
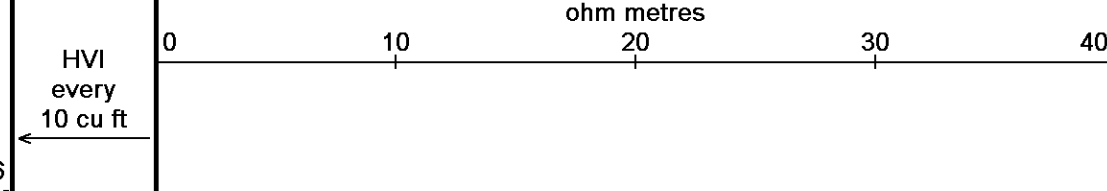
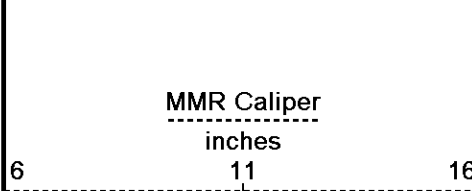
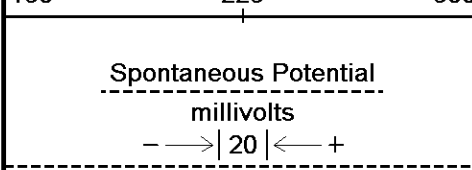
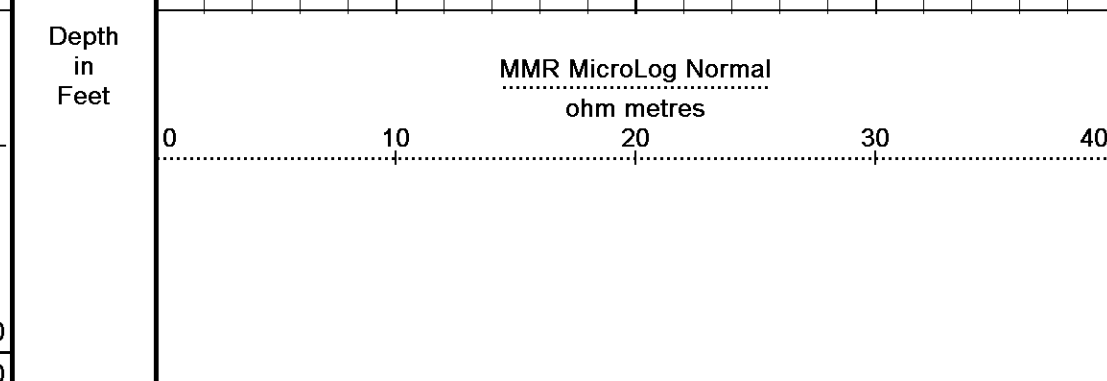
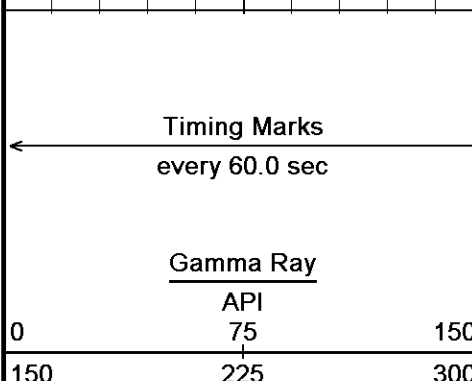
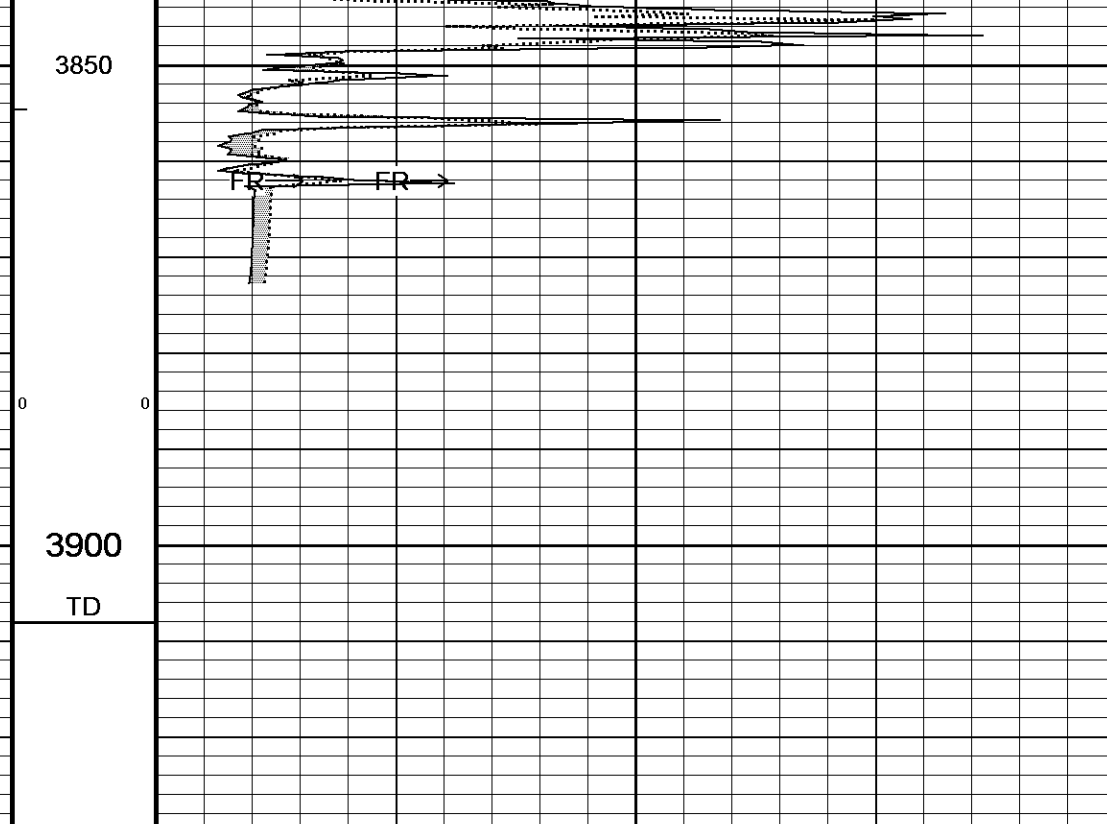
Replay
Scale
1:240



3606
100







↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_001.dta

General Constants All 000 Last Edited on 04-OCT-2016,15:43

General Parameters		
Mud Resistivity	0.460	ohm-metres
Mud Resistivity Temperature	75.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
 Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	None	
 Rwa Parameters		
Porosity used	Limestone Density Por.	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0 Field Calibration on 24-JUL-2016 15:20

Reading No	Measured	Calibrated (lbs)
1	15235.81	0.00
2	16026.61	481.00

Gamma Calibration MCG-C 123 Field Calibration on 04-OCT-2016 08:13

	Measured	Calibrated (API)
Background	143	100
Calibrator (Gross)	795	556
Calibrator (Net)	652	456



Gamma Constants MCG-C 123 Last Edited on 04-OCT-2016,13:32

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-C 123 Field Calibration on 31-OCT-2015,17:05

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

	Measured	Calibrated (mV)
Reference 1	101.2	100.6
Reference 2	-99.1	-99.9

Micro Normal and Micro Inverse Calibration MMR-C.A 247

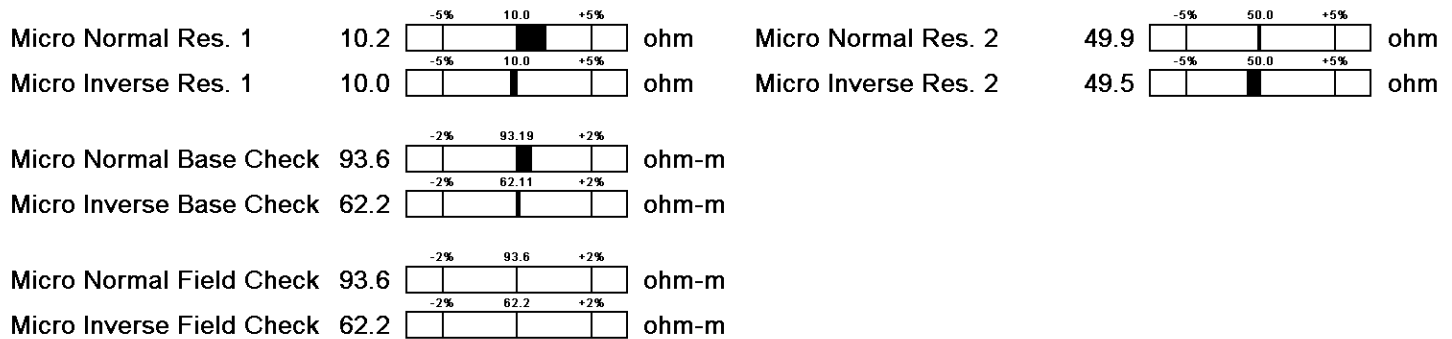
Base Calibration on 28-AUG-2016 19:13
Field Check on 04-OCT-2016 15:26

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.2	49.9	5.1	25.6
Micro Inverse	10.0	49.5	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.6	93.6
Micro Inverse	62.2	62.2

Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 247



Micro Normal and Micro Inverse Constants MMR-C.A 247

Last Edited on 26-JUN-2016,15:44

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	0.5110	
Micro Inverse K Factor	0.3380	
Standoff Offset	0.0000	inches

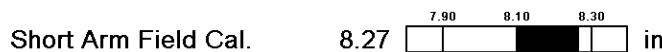
Caliper Calibration MMR-C.A 247

Base Calibration on 28-AUG-2016 19:08
Field Calibration on 04-OCT-2016 15:24

Base Calibration	Measured	Calibrator Size (in)
Reading No		
1	14869	5.98
2	18207	7.97
3	21411	9.86
4	25389	11.92
5	0	0.00
6	N/A	N/A

Field Calibration	Measured Caliper (in)	Actual Caliper (in)
	8.27	8.10

Caliper Calibration Tolerances MMR-C.A 247



Micro-Resistivity Caliper Constants MMR-C.A 247

Last Edited on

Sonde Configuration	Resistivity Mode
---------------------	------------------

Neutron Calibration MDN-A.B 66

Base Calibration on 22-MAY-2016,18:15
Field Check on 04-OCT-2016 08:22

Base Calibration	Measured		Calibrated (cps)	
	Near	Far	Near	Far
Ratio	3116	97	3714	110
	32.277		33.764	

Field Calibrator at Base	Calibrated (cps)
	2061 3028

0.681

Field Check

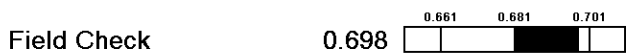
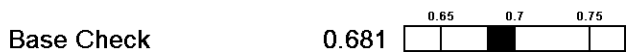
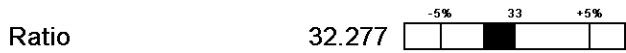
Calibrated (cps)

2167 3105

Ratio

0.698

Neutron Calibration Tolerances MDN-A.B 66



Neutron Constants MDN-A.B 66

Last Edited on 04-OCT-2016,13:32

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Legacy	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

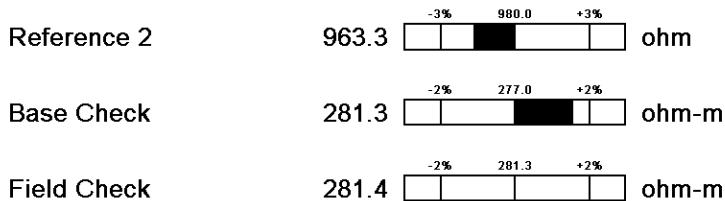
FE Calibration MFE-B.J 352

Base Calibration on 28-AUG-2016 18:58

Field Check on 04-OCT-2016 15:05

Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.3	126.8
Base Check		281.3
Field Check		281.4

FE Calibration Tolerances MFE-B.J 352



FE Constants MFE-B.J 352

Last Edited on 04-OCT-2016,15:04

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Borehole Correction Constants		
Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

Sonic Constants MSS-A.A 55

Last Edited on 04-OCT-2016,13:31

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft

Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft

Sonde Mode	Compensated
Hole Type	Open Hole

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A
Peak Amplitude Source		N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing	N/A			
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A	
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A
Use 4' Waveform to derive TR	N/A
Use 5' Waveform to derive TR	N/A
Use 6' Waveform to derive TR	N/A
3' Waveform Discriminator Level	N/A mV
4' Waveform Discriminator Level	N/A mV
5' Waveform Discriminator Level	N/A mV
6' Waveform Discriminator Level	N/A mV
3' Waveform Filter	N/A
4' Waveform Filter	N/A
5' Waveform Filter	N/A
6' Waveform Filter	N/A
Semblance Level	N/A
Semblance Window Width	N/A micro-sec
Sonic 1 Despiker	N/A N/A
Sonic 2 Despiker	N/A N/A

Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 04-OCT-2016 15:23

Base Calibration

Test Loop Calibration Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	17.6	473.6	9.3	966.2
2	6.4	385.9	7.6	821.4
3	3.2	264.0	5.2	566.0
4	2.1	135.5	2.6	279.2


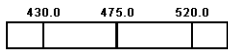
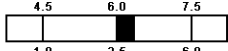
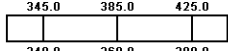
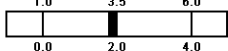
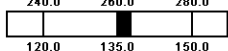
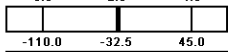
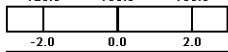
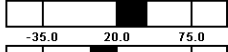
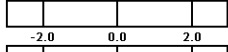
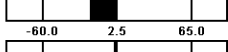
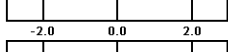
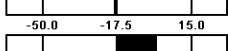
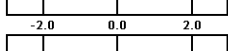

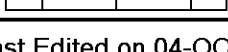
Array Temperature 23.0 Deg F

Test Loop Calibration Verified 22-MAY-2016,17:59

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	12.1	2072.0	15.0	2071.4

1	12.1	3873.0	15.9	3871.4
2	29.8	3528.1	32.3	3525.6
3	29.1	3021.3	31.1	3019.0
4	19.1	2058.5	20.5	2056.8
Deep	17.7	1962.1	19.1	1960.6
Medium	43.1	3976.4	45.6	3973.2
Shallow	44.4	5232.7	48.1	5229.1
Array Temperature	65.8		86.7 Deg F	

Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6		mmho/m	High Conductivity 1	473.6		mmho/m
Low Conductivity 2	6.4		mmho/m	High Conductivity 2	385.9		mmho/m
Low Conductivity 3	3.2		mmho/m	High Conductivity 3	264.0		mmho/m
Low Conductivity 4	2.1		mmho/m	High Conductivity 4	135.5		mmho/m
Background Vx 1	0.0		mmho/m	Phase Check Loop 1	0.0		%
Background Vx 2	0.0		mmho/m	Phase Check Loop 2	0.0		%
Background Vx 3	0.0		mmho/m	Phase Check Loop 3	0.0		%
Background Vx 4	0.0		mmho/m	Phase Check Loop 4	0.0		%

Induction Constants MAI-A.A 111

Last Edited on 04-OCT-2016,15:21

Induction Model	RtAP-WBM		
Borehole Correction Constants			
Tool Centred	No		
Hole Size Source	Density Caliper		
Hole Size Constant Value	N/A inches		
Stand-off Type	Fins		
Stand-off	0.50 inches		
Number of Fins on Stand-off	8.0000		
Stand-off Fin Angle	45.00 degrees		
Stand-off Fin Width	0.5000 inches		
Rm Source	Global Value: Temperature Corrected		
Temp. for Rm Corr.	MCG External Temperature		
Squasher Start	0.0020	mhos/metre	
Squasher Offset	N/A	mhos/metre	
Borehole Normalisation			
DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000
Calibration Site Corrections			
Channel 1	0.00	mmhos/metre	
Channel 2	0.00	mmhos/metre	
Channel 3	0.00	mmhos/metre	
Channel 4	0.00	mmhos/metre	
Symmetrised Receiver Gains			
Receiver 1	1.00		
Receiver 2	1.00		
Receiver 3	1.00		
Receiver 4	1.00		
Apparent Porosity and Water Saturation Constants			
Archie Constant (A)	1.00		
Cementation Exponent (M)	2.00		
Saturation Exponent (N)	2.00		
Saturation of Water for Apor	100.00	percent	
Resistivity of Water for Apor and Sw	0.05	ohm-m	
Resistivity of Mud Filtrate for Sw	0.00	ohm-m	

Source for Rt 0.00
 Source for Rxo 0.00

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 24-NOV-2014,10:23

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-A.A 111

Last Edited on 26-JUN-2014,15:06

Pre-filter Length 11

Photo Density Calibration MPD-B 104

Base Calibration on 28-AUG-2016 20:24
 Field Check on 04-OCT-2016 15:09

Density Calibration Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1145	1339		
Reference 1	49665	24007	59556	30836
Reference 2	20032	2442	24941	2541

Field Check at Base
 1144.9 1338.6

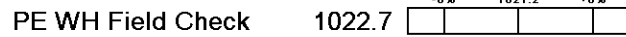
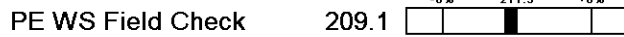
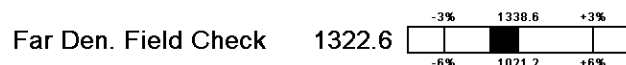
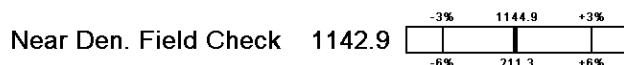
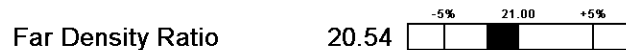
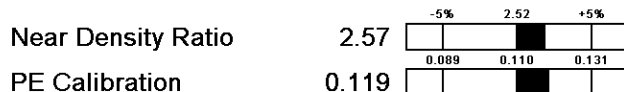
Field Check
 1142.9 1322.6

PE Calibration Base Calibration	WS	Measured		Calibrated Ratio
		WH	Ratio	
Background	211	1021		
Reference 1	20773	49486	0.424	0.371
Reference 2	5807	19899	0.296	0.272

Field Check at Base
 211.3 1021.2

Field Check
 209.1 1022.7

Photo Density Calibration Tolerances MPD-B 104



Density Constants MPD-B 104

Last Edited on 04-OCT-2016,15:09

Density Source Id P50557B
 Nylon Calibrator Number DNCE695
 Aluminium Calibrator Number DACD698
 Density Shoe Profile 8 inch
 Caliper Source for Processing Density Caliper
 PE Correction to Density Not Applied
 Mud Density 1.12 gm/cc
 Mud Density Z/A Multiplier 1.11
 Mud Filtrate Density 1.00 gm/cc
 Dry Hole Mud Filtrate Density 1.00 gm/cc
 DNCT 0.00 gm/cc
 CRCT 0.00 gm/cc
 Density Z/A Correction Hybrid

Matrix Density (gm/cc)	Depth (ft)
2.71	
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

0.00
0.00
0.00

0.00
0.00
0.00

Caliper Calibration MPD-B 104

Base Calibration on 28-AUG-2016 19:51
Field Calibration on 04-OCT-2016 15:20

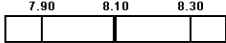
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13646	3.99
2	22688	5.98
3	31297	7.97
4	39521	9.86
5	48608	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.09	8.10

Caliper Calibration Tolerances MPD-B 104

Short Arm Field Cal. 8.09  in

DOWNHOLE EQUIPMENT

C:\Minimus 15.03.5939\Logs\O'Brien (LA) Jecha 4 #2\O'Brien (LA) Jecha 4 #2_001.dta

Cablehead, 11 pin
CBH-CA 176 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 247 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

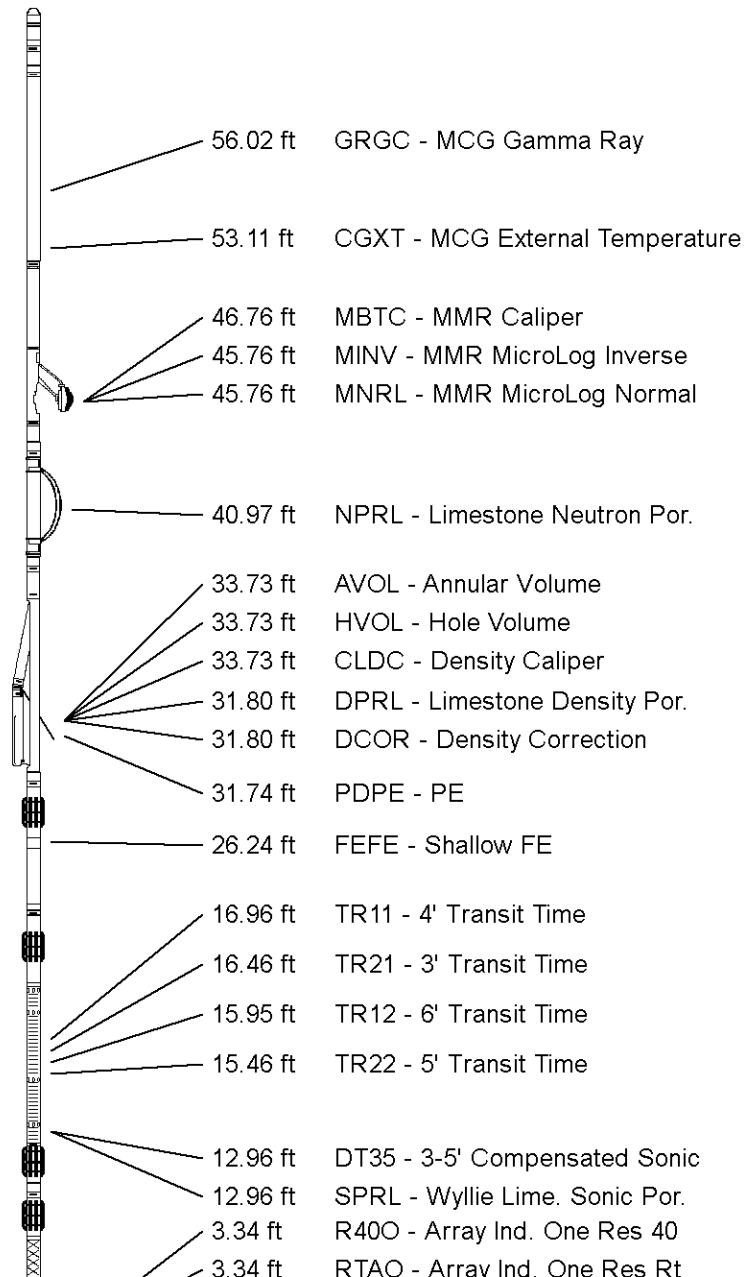
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-B 104 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

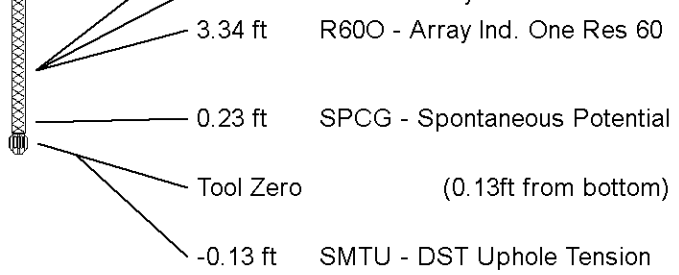
Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in



Total Length: 63.70 ft Weight: 480.6 lb



All measurements relative to tool zero.

COMPANY O'BRIEN RESOURCES, LLC.
WELL JECHA 4 #2
FIELD WILDCAT
PROVINCE/COUNTY RUSH
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2083.00	feet	First Reading	3862.00	feet
Elevation Drill Floor	2081.00	feet	Depth Driller	3907.00	feet
Elevation Ground Level	2070.00	feet	Depth Logger	3908.00	feet



Weatherford[®]

MICRORESISTIVITY LOG